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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,936	12/14/2004	Kiyotaka Kobayashi	P26391	8652
7055	7590	11/16/2005	EXAMINER	
GREENBLUM & BERNSTEIN, P.L.C.			ZEWDU, MELESS NMN	
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RESTON, VA 20191			PAPER NUMBER	

2683

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/516,936	KOBAYASHI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Meless N. Zewdu	2683	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-11 and 13-15 is/are rejected.
- 7) ☒ Claim(s) 8, 12 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/15/05</u> . | 6) <input type="checkbox"/> Other: ____.  |

### **DETAILED ACTION**

1. This action is the first on the merit of the instant application.
2. Claims 1-16 are pending in this action.

#### ***Specification***

The abstract of the disclosure is objected to because it is presented in two paragraphs, as oppose to a single one, as required by the rules and practices of the Office. Correction is required. See MPEP § 608.01(b).

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Diversity Transmission and Reception Method for wireless Communications.

#### ***Claim Objections***

Claim 14 is objected to because of the following informalities: the claim recites a frame configuring section, which "determines a predetermined parameter" (see lines 20-21). **Determining a predetermined parameter** is a redundant recitation. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4-6, 9, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj et al. (Paulraj) (US 6,351,499 B1) in view of Birchler et al. (Birchler) (US 5,440,590).

**As per claim 1:** Paulraj discloses a communication method in a system where wireless communications is carried out using multi antennas in both a transmission apparatus and a reception apparatus (see figs.1 and 2; col. 3, lines 43-52), comprising:

an estimation step of estimating a reception electric field strength of the entire system (see fig. 4, block 84; fig. 7, block 130; col. 9, lines 22-59). The channel matrix represents the entire system.

a control step of controlling a predetermined parameter based on the reception electric field strength of the entire system (see abstract; col. 4, lines 1-12; col. 9, lines 52-67). (SINR), power level, and/or SNR, etc. utilized in the prior art can be considered as a measure/s of reception electric field strength. Furthermore, the control step does not control the predetermined parameter based on the **estimated** and **calculated** electric field strength, but based on the reception electric field strength of the entire system and the effective electric field strength.

transmission step of transmitting in the transmission apparatus a signal processed with the parameter determined (see col. 3, lines 15-27; 53-67). According to the prior art, transmission is made based on a reception quality/parameter determined/processed from a received feedback signal. Note: since the predetermined parameter is not specified, any of the parameters mentioned in the prior art (e.g., antenna direction, adaptive modulation, etc.) can read on the featured parameter. But,

although Paulraj discloses about estimating a received matrix of channel (multi channel signals), he does not explicitly teach about a calculation step calculating an effective reception electric field strength, that is a reception electric field strength usable in demodulation processing, as claimed by applicant. However, in a related field of endeavor, Birchler teaches about a method and apparatus for producing a usable signal (effective/decodable signal) from received diverse modulated signals, wherein the usable signal is produced from a diversity receiver estimates of received signals (see col. 3, lines 20-26). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the teaching of Paulraj with that of Birchler for the stated advantage of producing a more usable signal for a diversity receiver.

**As per claim 2:** Paulraj teaches a communication method, wherein a modulation scheme is controlled as control of the parameter in the control step, while a signal modulated with the modulation scheme determined is transmitted in the transmission step (see col. 2, lines 13-20; col. 3, lines 59-67). The modulation scheme of the prior art is adaptive (adaptively controlled) and its adaptive state enables (controls) a transmitter to adjust coding.

**As per claim 4:** Paulraj teaches a communication method wherein, while a signal amplified (see col. 12, lines 20-24) to the transmission power determined is transmitted in the transmission step (see col. 2, lines 50-53, 56-59). Power is adaptively controlled.

**As per claim 5:** Paulraj teaches a communication method wherein a communication scheme is determined from either MIMO communications or space-time coding

Art Unit: 2683

communications as control of the parameter in the control step, while a signal is transmitted in the transmission scheme determined in the transmission step (see col. 4, lines 26-32).

**As per claim 6:** Paulraj teaches a communication method wherein a coding method is controlled as control of the parameter in the control step, while a signal encoded in the coding method determined is transmitted in the transmission step (see col. 3, lines 59-5367; col. 4, lines 26-32).

**As per claim 9:** the features of claim 9 are similar to the features of claim 1, except one difference directed to -- a reception step of receiving in the reception apparatus a signal in the parameter determined which is also taught by Paulraj (see col. 3, lines 15-36; col. 4, lines 26-32). Paulraj's multi-antenna receiver receives a signal based on a parameter determined. Hence, claim 9 is rejected on the same ground and motivation as claim 1.

**As per claim 13:** the features of claim 13 are similar to the features of claim 1, except claim 1 is a method claim and claim 13 is an apparatus claim as their difference. Since, the apparatus of claim 13 is required to perform its function according to the steps of claim 1, claim 13 is rejected on the same ground and motivation as claim 1.

**As per claim 15:** the features of claim 15 are similar to the features of claim 1, except one difference directed to -- a receiver that receives a signal in the parameter controlled which is also taught by Paulraj (see col. 3, lines 15-36; col. 4, lines 26-32). Paulraj's multi-antenna receiver receives a signal based on a parameter controlled/determined. Hence, claim 15 is rejected on the same ground and motivation as claim 1.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Birchler as applied to claim 1 above, and further in view of Classon et al. (Classon) (US 2003/0123559 A1).

**As per claim 3:** but, the above references do not explicitly teach about a communication method wherein a transmission antenna is selected as control of the parameter in the control step, while a signal is transmitted from the transmission antenna selected, in the transmission step, as claimed by applicant. However, in a related field of endeavor, Classon teaches about Adaptive transmission method, wherein a particular transmission antenna or a plurality of transmission antennas are selected amongst a plurality of candidate antennas and wherein a corresponding parameter (modulation and coding) is selected for use with the selected antenna (see page 4, paragraph 0042 through page 5, line 30, particularly, page 5, col. 1, lines 22-30). Note: in the feature "transmission antenna is selected as control of the parameter", the recited parameter is not specified. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references with the teaching of Classon for the advantage of improving the overall system data throughput for a multi-carrier communications systems (see page 2, paragraph 0010).

Claims 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Birchler as applied to claims 1 and 9 above, and further in view of Rudrapatna (US 6,801,709 B2).

**As per claim 7:** but, the references applied in claims 1 and 9 above, do not explicitly teach about a communication method wherein, antenna characteristics are controlled as control of the parameter in the control step, while a signal is transmitted in the antenna characteristic determined, in the transmission step, as claimed by applicant. However, in a related field of endeavor, Rudrapatna teaches about a multiple antenna configuration, including an antenna array comprising at least two antenna groups for transmission and reception, wherein a particular frequency at which any specific antenna operates depends on various electrical and mechanical characteristics of the antenna (see col. 4, lines 5-35, particularly lines 23-35). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references with the teaching of Rudrapatna for the advantage of performing transmission/reception diversity operations without having to deploy additional antennas (see col. 3, lines 14-23).

**As per claim 11:** the feature of claim 11 is similar to the feature of claim 7, except claim 7 is directed to transmission and claim 11 is directed to reception. However, the teaching of Rudrapatna's reference applies for both transmission and reception (see col. 4, lines 14-18). Therefore, claim 11 is rejected on the same ground and motivation as claim 7.



Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Birchler as applied to claims 1 and 9 above, and further in view of Hamied et al. (Hamied) (US 2003/0147458 A1).

**As per claim 10:** but, the above references do not explicitly teach about a communication method, wherein a reception antenna is selected as control of the parameter in the control step, while a signal is received in the reception antenna selected, in the reception step, as claimed by applicant. However, in a related field of endeavor, Hamied teaches about, Adaptive vector modulation method and system, wherein, in a multi-antenna transceivers and links within a wireless system, one of the receiver antennas is selected, as a function of an average injection power (a parameter), for receiving a signal from a transmitter antenna(s) (see figs. 1 and 2; page 1, paragraph 0004). Note: since the featured "parameter", above is not defined,

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Birchler and further in view of Lu et al. (US 2003/0185241 A1).

**As per claim 14:** Paulraj discloses a reception apparatus in a system where wireless communications is carried out using multi antennas in both a transmission apparatus and a reception apparatus (see figs.1 and 2; col. 3, lines 43-52), comprising:

an electric field strength estimator that estimates a reception electric field strength of the entire system (see fig. 4, block 84; fig. 7, block 130; col. 9, lines 22-59). The channel matrix represents the entire system. But, Paulraj does not explicitly teach about an effective electric field strength calculator that calculates an effective reception electric field strength that is a reception electric field strength usable in demodulation

processing, as claimed by applicant. However, in a related field of endeavor, Birchler teaches about method and apparatus for producing a usable signal (effective/decodable signal) from received diverse modulated signals, wherein the usable signal is produced from a diversity receiver estimates of received signals (see col. 3, lines 20-26).

Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the teaching of Paulraj with that of Birchler for the stated advantage of producing a more usable signal for a diversity receiver. The combined references provide a reception electric field strength of the entire system and the effective reception electric field strength including a multi antenna transmission and reception apparatus. But, Paulraj in view of Birchler do not explicitly teach about a frame configuring section/method which determines a predetermined parameter, and transmits information indicative of the parameter determined to the transmission apparatus and a receiver that receives a signal processed with the parameter determined in the transmission apparatus, as claimed by applicant. However, in a related field of endeavor, Lu teaches about a frame configuring section/method (see page 2, paragraph 0013) which determines a predetermined parameter (see page 2, paragraph 0013, "QoS"), and transmits information indicative of the parameter determined to the transmission apparatus (see page 1, paragraphs 0014 and 0016) and a receiver that receives a signal processed with the parameter determined in the transmission apparatus (see page 2, paragraphs 0014 and 0016; claim 11). Note: the frame configuring section does not utilize the **estimated** reception electric field strength of the entire system and the **calculated** effective reception electric field strength in

Art Unit: 2683

determining the predetermined parameter. Hence, when the references are combined as discussed above, the frame configuring section/method will include the reception electric field strength of the entire system and the effective reception electric field strength in determining the predetermined parameter. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references with the teaching of Lu for the advantage of coordinating the behavior of a plurality of wireless devices in a wireless network (see page 2, paragraph 0016).

### ***Allowable Subject Matter***

Claims 8, 12 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meless N. Zewdu whose telephone number is (571) 272-7873. The examiner can normally be reached on 8:30 am to 5:00 pm..

Art Unit: 2683

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Trost can be reached on (571) 272-7872. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or related to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

Meless Zewdu



Examiner

13 November 2005.